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Success Story

INTEGRATED POWERHEAD DEMONSTRATION PROJECT ENTERS FAST-PACED TEST PHASE



Testing is under way of critical components for integration into the world's first full-flow-cycle hydrogen/oxygen boost engine. A recent test of the Propulsion Directorate's Integrated Powerhead Demonstration (IPD) project in California established a technical first for the United States (US) and marks the first advancements in boost engine technology since the initial development of the Space Shuttle Main Engine (SSME) in the 1970s.



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Accomplishment

Testing of the Department of Defense's (DoD's) IPD project is under way at the Aerojet E-Complex test facilities in Sacramento. Directorate engineers successfully tested the IPD fuel preburner to 50% power, satisfying all pretest predictions and meeting all test objectives. The fuel preburner will eventually deliver hot hydrogen drive gas to power an advanced hydrogen turbo pump in the engine system.

This successful test kicks off a new stage in the IPD program where directorate engineers will test combustion and turbo machinery components at both Aerojet and the National Aeronautics and Space Administration's (NASA's) Stennis Space Center in Mississippi. Following this test phase, directorate engineers will integrate all components into the world's first full-flow-cycle hydrogen/oxygen boost engine.

Background

The IPD program supports the DoD Integrated High Payoff Rocket Propulsion Technology (IHPRPT) program. The goal of this program is to double the capability of boost engines for access to space. The IPD program is also a very successful partnership between AFRL and NASA's Marshall Space Flight Center in Huntsville, Alabama, which provides additional technical expertise and program support.

IPD's full-flow staged combustion engine is a technical first for the US. The program brings together combustion device components from Aerojet, and turbo machinery and system integration expertise from Boeing-Rocketdyne of Canoga Park, California. This combination will extend the life cycle of boost engines and reduce the amount of maintenance between missions. IPD is also the first cryogenic boost engine technology program since the development of the SSME in the 1970s.

The IHPRPT program is a DoD/NASA/industry-coordinated effort to develop revolutionary and innovative technologies by the year 2010. This effort will double rocket propulsion capabilities over early 1990s state-of-the-art technology.

Additional information

To receive more information about this or other activities in the Air Force Research Laboratory, contact TECH CONNECT, AFRL/XPTC, (800) 203-6451 and you will be directed to the appropriate laboratory expert. (03-PR-04)